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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/588,297

11/02/2006

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EXAMINER

ASFAW, MESFIN T

ART UNIT

PAPER NUMBER

2882

NOTIFICATION DATE

DELIVERY MODE

10/26/2010

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No. 10/588,297	Applicant(s) KOBAYASHI ET AL.	
	Examiner Mesfin T. Asfaw	Art Unit 2882	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 August 2010.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8, 10, 30-33, 35, 44, 65, 68 and 70-83 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8, 10, 30-33, 35, 44, 65, 68 and 70-83 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>02/02/2010, 08/02/2010</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

The amendment filed on 08/04/2010 has been entered. Claims 1-8, 10, 30-33, 35, 44, 65, 68, and 70-83, are pending in this application.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-4, 6, 8, 10, 44, and 70-72, are rejected under 35 U.S.C. 103(a) as being unpatentable over Mori et al. [US 5063582, hereafter Mori] in view of Tabarelli et al. [US 4509852, hereafter Tabarelli].

As per Claims 1, 44, 72, Mori teaches an exposure apparatus (See fig. 1) which exposes a substrate 4 by radiating an exposure light beam onto the substrate, the exposure apparatus comprising:

A substrate stage 6 which has a substrate-holding member 5 for holding the substrate 4 and which is movable; and a temperature adjustment system 9 which performs temperature adjustment for the substrate-holding member (Column 2 line 20 – Column 3 line 15).

Mori does not explicitly teach exposing the substrate through a liquid and adjusting the temperature of the substrate-holding member depending on a temperature of the liquid to be supplied onto the substrate held by the substrate-holding member.

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Tabarelli teaches the use of an immersion liquid to expose the a semiconductor disk (substrate) through, wherein the liquid 6 cleans the semiconductor disk 8 retained on the support 1 by means of vacuum lines 9 and keeps the temperature of the disk constant, feeding pipes 4 and discharge pipes 5 leading to the container 2 create constant conditions. A pump 10, a filter 11 and means 12 effecting a temperature increase or decrease depending on the measured temperature (Column 6 lines 28-42).

Therefore, it would have been obvious, to one of ordinary skill in the art, at time the invention was made, to incorporate the immersion system of Tabarelli in the exposure system of Mori so that irradiating an exposure light beam onto the substrate through a liquid is possible with increased refractive index. Moreover, one of ordinary skill in the art would be motivated to keep the temperature of the substrate-holding member and the temperature of the liquid supplied onto the substrate held by the substrate-holding member because the ultimate goal is to keep the temperature of the substrate at a predetermined temperature as disclosed by Mori and Tabarelli.

As per Claims 2-4, and 70-71, Mori as modified by Tabarelli teaches the temperature adjustment system performs the temperature adjustment for the substrate-holding member so that heat transfer is reduced between the substrate and the liquid on the substrate (the temperature of the substrate-holding member and the temperature of immersion liquid should be set at the same temperature such that to keep temperature of the substrate at a predetermined temperature, therefore the heat transfer between the substrate and the liquid on the substrate would be reduced or no net heat transfer among the liquid, the substrate and the holding member occurs).

As per Claim 6, Mori in view of Tabarelli teaches the temperature adjustment system 9 performs the temperature adjustment for the substrate-holding member 5 so that no temperature change of the substrate is caused by contact between the liquid and the substrate (the temperature of the substrate-holding member and the temperature of immersion liquid should be set at the same temperature such that to keep temperature of the substrate at a predetermined temperature, therefore the heat transfer would be reduced between the substrate and the liquid on the substrate or no net heat transfer among the liquid, the substrate and the holding member).

As per Claim 8, Mori as modified by Tabarelli does not explicitly teach the temperature adjustment system uses a liquid which is same as the liquid to be supplied onto the substrate to perform the temperature adjustment for the substrate-holding member.

However, the combined teaching of Mori and Tabarelli teaches that a liquid with the same temperature is supposed to be delivered both to the substrate stage, and in the space between the optical element and the substrate such that heat transfer between the stage and the wafer and between the wafer and the liquid disposed above the wafer is minimized.

Therefore, it would have been obvious, to one of ordinary skill in the art, at time the invention was made, to employ a liquid supply system that can deliver a liquid to the substrate-holding member and onto the substrate to reduce the chance of a temperature variation between the two liquids and reduce the cost by using the same supply unit.

As per Claim 10, Mori teaches a temperature sensor which measures a temperature of the substrate-holding member (Column 3 line 57 - Column 4 line 2).

3. Claims 73, 74-77, and 79-83, are rejected under 35 U.S.C. 103(a) as being unpatentable over Mori in view of Tabarelli as applied in claim 1 above, further in view of Lof et al. [US 20040165159 A1, hereafter Lof].

As per Claim 73, Mori in view of Tabarelli teaches exposure apparatus according to claim 1, further comprising a liquid supply system having a supply inlet (See Tabarelli fig 3-4).

Mori as modified by Tabarelli does not explicitly teach the liquid supplied onto the substrate from the supply inlet covering only a portion of a surface of the substrate.

Lof teaches the liquid supplied onto the substrate from the supply inlet covering only a portion of a surface of the substrate (See fig. 2, Para 14).

Therefore, it would have been obvious, to one of ordinary skill in the art, at time the invention was made, to provide an immersion liquid between the last optical element of the projection lens and the substrate such that to cover only a portion of the surface of the substrate in order to minimize the volume of liquid that must be accelerated during stage movements.

As per Claims 74-77, 79-83, Mori in view of Tabarelli and Lof teaches the method as claimed, because under the principles of inherency, if a prior art device, in its normal and usual operation, would necessarily perform the method claims, then the method claimed will be considered to be anticipated by the prior art device. When the

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prior art device is the same as a device described in the specification for carrying out the claimed method, it can be assumed the device will inherently perform the claimed process. See *In re King*, 801 F.2d 1324,231 MPEP 2112.02".

4. Claims 5, 7, 30-33, and 35, are rejected under 35 U.S.C. 103(a) as being unpatentable over Mori in view of Tabarelli and Nijmeijer et al. [US 20040189964 A1, hereafter Nijmeijer].

As per Claims 30, 65, 68, Mori teaches an exposure apparatus (See fig. 1) which exposes a substrate 4 by radiating an exposure light beam onto the substrate, the exposure apparatus comprising: a substrate stage 6 which has a substrate-holding member 5 for holding the substrate and which is movable (Column 2 line 20 – Column 3 line 15).

Mori does not explicitly teach exposing the substrate through a liquid and adjusting the temperature of the substrate-holding member depending on a temperature of the liquid to be supplied onto the substrate held by the substrate-holding member.

Tabarelli teaches the use of an immersion liquid to expose the a semiconductor disk (substrate) through, wherein the liquid 6 cleans the semiconductor disk 8 retained on the support 1 by means of vacuum lines 9 and keeps the temperature of the disk constant, feeding pipes 4 and discharge pipes 5 leading to the container 2 create constant conditions. A pump 10, a filter 11 and means 12 effecting a temperature increase or decrease depending on the measured temperature (Column 6 lines 28-42).

Therefore, it would have been obvious, to one of ordinary skill in the art, at time the invention was made, to incorporate the immersion system of Tabarelli in the exposure system of Mori so that irradiating an exposure light beam onto the substrate through a liquid is possible with increased refractive index. Moreover, one of ordinary skill in the art would be motivated to keep the temperature of the substrate-holding member and the temperature of the liquid supplied onto the substrate held by the substrate-holding member because the ultimate goal is to keep the temperature of the substrate at a predetermined temperature as disclosed by Mori and Tabarelli.

Mori in view of Tabarelli does not explicitly teach a second substrate stage which has a substrate-holding member for holding the substrate and which is movable; a measuring station which performs measurement for the substrate held by one of the stages; and temperature adjustment systems which are provided for the first substrate stage and the second substrate stage respectively and which perform temperature adjustment for the substrate-holding member of each of the stages depending on a temperature of the liquid to be supplied from the liquid supply system.

Nijmeijer teaches a first substrate stage WTa (See fig. 1) which has a substrate-holding member for holding the substrate and which is movable while holding the substrate by the aid of the substrate-holding member; a second substrate stage WTb which has a substrate-holding member for holding the substrate and which is movable (Para 51-52 and Nijmeijer also disclosed use of immersion liquid in Para 139-140); a measuring station MS which performs measurement for the substrate held by one of the stages (Para 58).

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Therefore, it would have been obvious, to one of ordinary skill in the art, at time the invention was made, to incorporate the dual stage system of Nijmeijer in the lithographic system of Mori as modified by Tabarelli in order to increase substantially the machine throughput.

Furthermore, one of ordinary skill in the art would have used the same temperature controlling system for both substrate tables in order to make the system consistent and efficient which processes the substrate under identical temperature conditions and also provides a system which conserves a space.

As per Claim 31, Nijmeijer teaches wherein the measurement for the substrate in the measuring station includes measurement of surface position information about a surface of the substrate (Para 58).

As per Claim 32, Nijmeijer teaches wherein the measurement for the substrate in the measuring station includes detection of an alignment mark on the substrate (Para 94 and 103).

As per Claim 33, Mori teaches wherein the temperature adjustment system performs the temperature adjustment for the substrate-holding member before performing the measurement for the substrate (Abstract).

As per Claim 35, Mori teaches the temperature adjustment system performs, after the measurement for the substrate in the measuring station, the temperature adjustment for the substrate-holding member to suppress temperature change of the substrate (Column 3 lines 15-57).

As per Claim 5, Mori in view of Tabarelli and Nijmeijer teaches a surface position-detecting unit 21a, 22a, 21b, 22b (See Nijmeijer fig. 8) which detects surface position information about a surface of the substrate by emitting a detecting light beam onto the substrate through the liquid and receiving a reflected light beam from the substrate through the liquid (Para 12-14), wherein the temperature adjustment system performs the temperature adjustment for the substrate-holding member to suppress measurement error of the surface position-detecting unit due to the temperature change of the liquid (Tabarelli Column 6 lines 28-42).

As per Claim 7, Mori in view of Tabarelli and Nijmeijer teaches a mark-detecting system which detects an alignment mark on the substrate not through the liquid, wherein the temperature adjustment system performs the temperature adjustment for the substrate-holding member so that no temperature change of the substrate is caused by the contact between the liquid and the substrate after detecting the mark by the mark-detecting system (Nijmeijer Para 57 and 103).

5. Claim 78, is rejected under 35 U.S.C. 103(a) as being unpatentable over Mori in view of Tabarelli, Nijmeijer and Lof.

As per Claim 78, Mori in view of Tabarelli, Nijmeijer and Lof teaches the method as claimed, because under the principles of inherency, if a prior art device, in its normal and usual operation, would necessarily perform the method claims, then the method claimed will be considered to be anticipated by the prior art device. When the prior art device is the same as a device described in the specification for carrying out the

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claimed method, it can be assumed the device will inherently perform the claimed process. See *In re King*, 801 F.2d 1324,231 MPEP 2112.02".

Response to Arguments

6. Applicant's arguments with respect to claims 1, 9-10, 30-35, and 65, have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mesfin T. Asfaw whose telephone number is 571-270-5247. The examiner can normally be reached on Monday to Friday, 7:30 - 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward J. Glick can be reached on 571-272-2490. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Mesfin T Asfaw/
Examiner, Art Unit 2882

/Edward J Glick/
Supervisory Patent Examiner, Art Unit 2882